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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,448	12/10/2001	Robert Thomas Bailis	RPS920010128US1	5281

47052 7590 07/01/2005

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EXAMINER

BRITT, CYNTHIA H

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 07/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/016,448	Applicant(s) BAILIS ET AL.	
	Examiner Cynthia Britt	Art Unit 2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/15/02 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Claims 1, 13, and 15 have been amended to add the negative limitation "without requiring input/output (I/O) pins to access the internal signals". Although the MPEP does allow for negative limitations as described in MPEP 2173.05(i)

The current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation. So long as the boundaries of the patent protection sought are set forth definitely, albeit negatively, the claim complies with the requirements of 35 U.S.C. 112, second paragraph. Some older cases were critical of negative limitations because they tended to define the invention in terms of what it was not, rather than pointing out the invention.

Any negative limitation or exclusionary proviso must have basis in the original disclosure. If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims. See In re Johnson, 558 F.2d 1008, 1019, 194 USPQ 187, 196 (CCPA 1977) ("[the] specification, having described the whole, necessarily described the part remaining."). See also Ex parte Grasselli, 231 USPQ 393 (Bd. App. 1983), aff'd mem., 738 F.2d 453 (Fed. Cir. 1984). The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a prima facie case for lack of descriptive support. Ex parte Parks, 30 USPQ2d

1234, 1236 (Bd. Pat. App. & Inter. 1993). See MPEP § 2163 - § 2163.07(b) for a discussion of the written description requirement of 35 U.S.C. 112, first paragraph.

This being stated, the examiner would like to point out that although there is no literal basis in the specification, reading the parts of the specification as pointed out by applicant (Current amendment; page 6, lines 5 and 6), if read in this context, seem to contradict with other segments of the specification (Abstract, page 4, line 20 through page 5 line 1, page 15 lines 7-12). In statements such as: "An ASIC using FPGA function within a standard cell design is utilized to create an internal-to-the-ASIC bridging of internal signals to observe and control of the internal signals of the ASIC. By the placement of logic, which expresses a test program, into the FPGA function that manipulates the I/O pins and/or other functional entities of interest, the ASIC function and/or surrounding logic can be easily verified."

Applicant appears to be arguing that the observed and controlled signals are not sent external to the circuit (page 8 of current amendment). This being the case, "By the placement of logic, which expresses a test program, into the FPGA function that manipulates the I/O pins and/or other functional entities of interest..." would seem unnecessary. However this argument also appears to contradict the aspects of dependent claim 3 which states: "...the signal connector function comprises a first logic for providing an external I/O function and a second logic which is in communication with

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the first logic that selects the appropriate internal signals for external observation and control.”

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1,13 and 15, due to the current amended portions and apparent contradictions as recited above are rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter.

Claims 2-12, 14, and 16-19 are dependent upon the independent claims 1, 13, and 15 and thus inherit the 35 USC 112 second paragraph issues of the independent claims.

Since the amendments to the claims render the claims indefinite, the previous rejection is maintained.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Shen et al. U.S. Patent No. 6,829,751.

As per claim 1, Shen et al. teaches providing a method and/or architecture for implementing a diagnostic architecture using an (*field programmable function*) FPGA core in a system on-chip design that can (i) ease bringing up, verification and debugging by providing interconnection and programming options; (ii) *observe* important signals while the chip is running under a normal mode; (iii) run at a single step mode while under the *control* of the FPGA core; (iv) display appropriate signals on a debugging workstation, allowing many debugging features to be supported such as: (a) triggering and tracing based on *internal signals*, (b) dynamically changing host register values and (c) providing complex monitoring functions (*observation and control*), since the (*field programmable function*) FPGA is programmed; (v) reduce debugging/verification time and/or (vi) improve product time to market. (Column 1 line 56 through column 2 line12)

The register block communicates with the FPGA core through a bus (*at least one bus coupled to at least a portion of the logic functions*). Similarly, the register block (*standard cell*) can also communicate with the FPGA core through other busses. The buses can be implemented as multi-bit buses or can also be implemented as single bit buses, if appropriate. Additionally, the buses can also be implemented as bidirectional buses. The FPGA core can also communicate with the control block (*standard cell*)

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through a bus. The FPGA core can communicate through a number of I/O pins over a bus. (Fig 2, column 3 lines 13-31) By using the FPGA core to implement such chip diagnostics, simultaneous probing of internal signals can be achieved while the system is running under predetermined conditions (e.g., a normal mode of operation). (Column 3 lines 32-42 figure 2) This circuit can also be implemented by the preparation of (*application specific integrated circuit*) ASICs, FPGAs, or by interconnecting an appropriate network of conventional component circuits. (Column 5 lines 54-58) The circuit can provide a FPGA core in an ASIC architecture that eases chip bring up, verification and debugging by interconnection and programming options. This allows important signals of a chip to be observed while the chip is running under a normal mode by connecting the internal signals to the FPGA core I/O. This allow all the signals of the chip to be displayed while the chip is running under a single step mode by allowing a FPGA core to control the chip. (Column 6 lines 18-30)

As per claims 2 and 3, Shen et al. teaches one or more chip I/O pins are connected to the FPGA core. Such a connection can allow the FPGA core to monitor the I/O of the chip. In addition, one of the I/O pins can be connected as an input pin to the FPGA core. An internal module from the FPGA core can generate a signal to drive the chip during the chip debugging. With a system on chip design, the signals among different blocks can also be connected through the FPGA core. Additionally, the FPGA core can bridge signals between different modules. Such bridging can help in debugging of different modules, and can also help in isolating problems. (Fig 5 column 4 line 59 through column 5 line 4)

As per claims 4 and 5, Shen et al. teaches the FPGA core can simultaneously probe multiple internal signals. By utilizing the scan chain under the single step mode and with the on-chip FPGA core acting as the data process center (*providing external I/O in communication with first logic that selects internal signals*), all the signals on the chip can be observed. The FPGA core can be used to bridge the signals (*signal connector function*) between different modules, and the under test mode, to isolate a specific module and drive signals to test the specific module. The FPGA core can also be used to add or verify bug fixes. (Column 6 lines 45-56, figures 2, 3, and 5)

As per claims 6–8, Shen et al. teaches the FPGA core can simultaneously probe multiple internal signals. By utilizing the scan chain under the single step mode and with the on-chip FPGA core acting as the data process center, all the signals on the chip can be observed. The FPGA core can be used to bridge the signals between different modules, and in the under test mode, to isolate a specific module and drive signals to test (*test program*) the specific module. The FPGA core can also be used to add or verify bug fixes (*error recovery and correction*). The process of the debugging workstation working with the on-chip FPGA core to generate debugging features can also be implemented. The system can provide functionality of CAD software that can be implemented to work with the diagnostics design (*error recovery and correction*). The system can allow for enhanced debugging capabilities (*error recovery and correction*) with the diagnostics design, such as searching for a specific signal pattern, tracing the internal state machine, and/or triggering on a programmed condition. The system can

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provide on the fly monitoring of the correctness of the bus protocol, doing statistics counting to measure the performance, and/or testing coverage. Column 6 lines 45-65

As per claim 9, Shen et al teaches providing a debugging workstation (*error written to external system*) (column 6 line 53-56).

As per claims 10 and 11, Shen et al. teaches the system can allow for enhanced debugging capabilities with the diagnostics design, such as searching for a specific signal pattern, tracing the internal state machine and/or triggering on a programmed condition (*watchdog function, invoking error handling process*). As the system is programmable, it would be inherent that the system could be programmed to have a watchdog function (interval timer to detect possible malfunction – IEEE dictionary of standard terms) or other function for error handling. (Column 6 lines 57-65)

As per claim 12, Shen et al. teaches using a field programmable gate array core system. (Abstract Figure 1)

As per claim 13, Shen et al. teaches providing a method and/or architecture for implementing a diagnostic architecture using an (*field programmable function*) FPGA core in a system on-chip (*standard cell and logic functions*) design that can (i) ease bringing up, verification and debugging by providing interconnection and programming options; (ii) observe important signals while the chip is running under a normal mode; (iii) run at a single step mode while under the *control* of the FPGA core; (iv) display appropriate signals on a debugging workstation (*observation*), allowing many debugging features to be supported such as: (a) triggering and tracing based on internal signals, (b) dynamically changing host register values and (c) providing complex monitoring

functions (*observation and control*), since the FPGA is programmed; (v) reduce debugging/verification time and/or (vi) improve product time to market. (Column 1 line 56 through column 2 line 12) This circuit can also be implemented by the preparation of (*application specific integrated circuit*) ASICs, FPGAs, or by interconnecting an appropriate network of conventional component circuits. (Column 5 lines 54-58) The circuit can provide a FPGA core in an ASIC architecture that eases chip bring up, verification and debugging by interconnection and programming options (*test program*). This allows important signals of a chip to be observed while the chip is running under a normal mode by connecting the *internal signals (observation and control of internal signals)* to the FPGA core I/O. This allows all the signals of the chip to be displayed while the chip is running under a single step mode by allowing a FPGA core to control the chip. (Column 6 lines 18-30) By using the FPGA core to implement such chip diagnostics, simultaneous probing of internal signals can be achieved while the system is running under predetermined conditions (e.g., a normal mode of operation). (Column 3 lines 32-42 figure 2) The FPGA core can simultaneously probe multiple internal signals. By utilizing the scan chain under the single step mode and with the on-chip FPGA core acting as the data process center, all the signals on the chip can be observed. The FPGA core can be used to bridge the signals between different modules, and the under test mode, to isolate a specific module and drive signals to test (*test program*) the specific module. The FPGA core can also be used to add or verify bug fixes. Column 6 lines 45-65

As per claim 14, Shen et al. teaches an internal module from the FPGA core can generate a signal to drive the chip during the chip debugging. With a system on chip design, the signals among different blocks can also be connected through the FPGA core. Additionally, the FPGA core can bridge signals between different modules. Such bridging can help in debugging of different modules (validation of at least one module). Such bridging can also help in isolating problems. Column 6 lines 45-56

As per claim 15, Shen et al. teaches providing a method and/or architecture for implementing a diagnostic architecture using an FPGA core in a system on-chip (*standard cell, logic functions*) design that can (i) ease bringing up, verification and debugging by providing interconnection and programming options; (ii) observe important signals while the chip is running under a normal mode; (iii) run at a single step mode while under the control of the FPGA core; (iv) display appropriate signals on a debugging workstation, allowing many debugging features to be supported such as: (a) triggering and tracing based on internal signals, (b) dynamically changing host register values and (c) providing complex monitoring functions (*test program*), since the FPGA is programmed; (v) reduce debugging/verification time and/or (vi) improve product time to market. (Column 1 line 56 through column 2 line12) This circuit can also be implemented by the preparation of (*application specific integrated circuit*) ASICS, FPGAs, or by interconnecting an appropriate network of conventional component circuits. (Column 5 lines 54-58) The circuit can provide a FPGA core in an ASIC architecture that eases chip bring up, verification and debugging by interconnection and programming options (*test program*). This allows important signals of a chip to be

observed while the chip is running under a normal mode by connecting the *internal signals (observation and control of internal signals)* to the FPGA core I/O. This allows all the signals of the chip to be displayed while the chip is running under a single step mode by allowing a FPGA core to control the chip. (Column 6 lines 18-30) The FPGA core can simultaneously probe multiple *internal signals*. By utilizing the scan chain under the single step mode and with the on-chip FPGA core acting as the data process center, all the signals on the chip can be observed. The FPGA core can be used to bridge the signals between different modules, and the under *test mode*, to isolate a specific module and drive signals to test the specific module. The FPGA core can also be used to add or verify bug fixes. (Column 6 lines 45-65)

As per claim 16, Shen et al. teaches that the FPGA core can simultaneously probe multiple internal signals. By utilizing the scan chain under the single step mode and with the on-chip FPGA core acting as the data process center, all the signals on the chip can be observed. The FPGA core can be used to bridge the signals between different modules, and the under test mode, to isolate a specific module and drive signals to test the specific module. The FPGA core can also be used to add or verify bug fixes (*determining if an error is observed and if observed, corrected*). The process of the debugging workstation working with the on-chip FPGA core to generate many powerful debugging features can also be implemented. (Column 6 lines 45-56)

As per claim 17, Shen et al. teaches providing a debugging workstation (*error written to external system*) (column 6 line 53-56).

As per claims 18 and 19, Shen et al. teaches the system can allow for enhanced debugging capabilities with the diagnostics design, such as searching for a specific signal pattern, tracing the internal state machine and/or triggering on a programmed condition (*watchdog function, invoking error handling process*). As the system is programmable, it would be inherent that the system could be programmed to have a watchdog function (interval timer to detect possible malfunction – IEEE dictionary of standard terms) or other function for error handling. (Column 6 lines 57-65)

Conclusion

The examiner would like to point out that the claims should clearly recite the method and/or circuit and the particular way that the signal is observed and/or controlled. The examiner is available for a telephone interview at the number below to discuss wording of the claims which could clear up the issues raised above.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Britt whose telephone number is 571-272-3815. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



JOSEPH TORRES
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Cynthia Britt
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